Visual Resources
Technical Memorandum

Klondike III/Biglow Canyon Wind Integration Project

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1 INTRODUCTION

David Evans and Associates, Inc. (DEA) prepared this visual resources technical memorandum for the Bonneville Power Administration (BPA) to support an Environmental Impact Statement for the Klondike III/Biglow Canyon Wind Integration Project.

The project would occur in rural, northeast Sherman County (Figure 1, Appendix A) and generally involves the development of a new transmission line, substation expansion, and appurtenances to integrate proposed private energy facilities (i.e., Klondike III Wind Project and Biglow Canyon Wind Farm) into BPA's transmission system. The transmission line begins roughly one mile south of the Columbia River at the John Day Substation to a point approximately four and a half miles east of Wasco, Oregon, and lies roughly three miles southwest of the John Day River at its closest point.

The Klondike III Wind Project, which would be built by PPM Energy, would consist of an approximately 273 megawatt (MW) wind generation project. The proposed project is adjacent to PPM Energy's Klondike I (24 MW) and Klondike II (75 MW) wind projects. It would be constructed on privately-owned land and be connected to the BPA Klondike Schoolhouse Substation. Klondike III Wind Project facilities would consist of up to 165 wind turbines and towers, approximately 19 miles of new roads, an operations and maintenance (O&M) facility, and two substations.

The Biglow Canyon Wind Farm facility, proposed by Orion Energy, would be an approximately 450 MW wind generation project. The Biglow Canyon Wind Farm will be connected to BPA's transmission system at one of two alternative substations on the Biglow Canyon Wind Farm site. Orion Energy is responsible for selecting its substation alternative. Orion Energy is responsible for selecting the option to be implemented. The Biglow Canyon Wind Farm would consist of up to 225 wind turbines and towers, approximately 40 miles of new roads, an O&M facility, and a substation.

Unless otherwise stated, all figures referenced herein are included in Appendix A; all photographs are in Appendix B.

1.1 METHODS

The analysis area (Figure 1) for visual resources extends approximately 30 miles beyond the transmission alignments. DEA conducted a site visit December 29 and 30, 2005, for the Klondike III/Biglow Canyon Wind Integration Project. DEA also reviewed recent documents from the Klondike III Wind Project Application for Site Certificate (ASC) (DEA, 2005) and the Biglow Canyon Wind Farm ASC (CH2M Hill 2005) and field-verified the findings of these documents to the extent practical. The findings of this memorandum are based upon information gathered during the field investigation, review of reference materials, and DEA's knowledge of visual and aesthetic resource management. DEA staff used a compilation of evaluation techniques prescribed by US Bureau of Land Management (BLM) and US Forest Service (USFS) to identify and assess potential impacts.

Spatial analyses and computer simulations were prepared using Geographic Information System (GIS) software and a suite of graphic software applications. The visibility analysis was conducted using US Geological Survey (USGS) Digital Elevation Models (DEMs). Visibility analysis and modeling techniques were used to determine areas from which the proposed facility would potentially be visible. The DEMs used in the analyses have 30-meter and 10-meter resolutions, meaning the ground is represented by a grid of squares that are 30m x 30m or 10m x 10m, and each square is assigned a single elevation. As such, the resolution of the DEMs is a limiting factor in the precision of these analyses. The models used in the analyses also do not include vegetation or structures, and do not account for attenuating climatic conditions such as distance, haze, humidity, weather, or background landscape. Therefore, it should be noted that these analyses generally overestimate areas of visibility.

Methods specific to the Klondike III Wind Project and Biglow Canyon Wind Farm visual analyses are described in detail in the respective ASCs for those projects.

2 PROPOSED ACTION AND ALTERNATIVES

BPA is considering two action alternatives and a No Action Alternative. The action alternatives consist of: 1) The Proposed Action – signing interconnection agreements with two wind developers, expanding an existing substation, building a new substation, and building a new double-circuit 230-kV transmission line along a northerly route alignment; and 2) The Middle Alternative, which includes the same elements of the Proposed Action but the transmission line alignment is different. Under the No Action Alternative, BPA would not build any new facilities, or sign any interconnection agreements.

The proposals for two wind projects, Klondike III Wind Project and Biglow Canyon Wind Farm, are also described in this section. The two wind projects would utilize the proposed BPA facilities and interconnection agreement to tie into BPA's power grid.

2.1 BPA PROPOSED ACTION

In the Proposed Action, BPA would build and operate a new double-circuit 230-kilovolt (kV) transmission line, build a new 230-kV substation, and expand its existing John Day 500-kV Substation. The double-circuit 230-kV transmission line would be built from BPA's new John Day 230-kV Substation to the Klondike III Wind Project's West Collector Substation. The line would carry 600 MW of capacity in each circuit. The Biglow Canyon Wind Farm project would be looped into one of the circuits located in between Klondike and the new John Day 230-kV Substation.

BPA would expand its existing John Day 500-KV Substation by about 0.3 acre inside the existing yard to include a new 500-kV bay with two transformers. The south fence would be extended and a dead end tower on the southwest corner would be built to connect to a new 230-kV substation.

BPA would build a new 230-kV substation adjacent to and south of John Day 500-kV Substation. The new substation would include a transformer, ring bus and other typical substation equipment. The new substation would encompass about 5 acres.

In addition, BPA proposes to analyze a new substation site in the vicinity of the Klondike III West Collector substation, not needed now, but possibly needed in the future.

2.1.1 Proposed Double-Circuit 230-kV Transmission Line

BPA proposes to build a double-circuit 230-kV transmission line. The proposed route for this line is the North Alternative, which is about 12 miles long.

2.1.1.1 Transmission Structures

Steel tubes and lattice steel transmission towers would be used to suspend the 230-kV transmission line in the air. Steel tubes would be used for tangent and small angle structures. Steel tubes average about 110 feet tall, with the average span 900 to 1,000 feet. Steel tubes are usually preferred in agricultural areas because they do not disrupt farming practices as much as other types of structures.

BPA would use lattice steel towers for the dead-end structures needed for the lines. Deadend structures equalize tension of the conductors between two segments of transmission line where the line makes a turn. Lattice steel towers would be used because they are more cost effective than steel tubes. Lattice steel towers average about 120 feet tall, with the average span 1,000-1,200 feet.

The steel tubes would be embedded in the ground about 20 to 25 feet, in a hole about 5 feet in diameter. The lattice steel towers would be attached to the ground on plate or grillage footings. Plate footings are 6 foot x 6 foot steel plates buried about 10 feet deep. Grillage footings are a 10 foot x 10 foot assembly of steel I-beams that have been welded together and buried 10-12 feet deep.

A trackhoe would be used to excavate an area for the footings. The excavation sidewalls would be sloped or shored to prevent collapse. All the soil and rock materials removed would later be used to backfill the excavated area once the footings are installed.

Transmission structures are normally assembled in sections at a structure site and lifted into place by a large crane (30-100 ton capacity). The construction of a tower and its footings could disturb an area of about an acre (200 feet x 200 feet) using plate and grillage footings.

2.1.1.2 Conductors and Insulators

The wires that carry electrical current in a transmission line are called conductors. The conductor proposed for this project would be about 1.3-1.6 inches in diameter. Conductors are suspended from tubes and towers with insulators. Insulators are made of nonconductive materials (rubber, porcelain or fiberglass) that prevent electric current from passing through the towers to the ground. Insulator strings of non-reflective material for BPA's line would be 10 inches in diameter, and 7 feet long.

Conductors and insulators are installed after the tubes and towers have been built. A pulling cable called a "sock line" is placed on pulleys or travelers that are attached to the insulators on the structures. The sock line is pulled through the pulleys, usually by helicopter. The end of the sock line is attached to a conductor on large reels mounted on trucks equipped with a brake system that allows the conductor to be unwound under tension. The sock line is used to pull the conductors through the series of pulleys mounted on the structures. Conductor tensioning sites are usually located every 2-3 miles.

About 10 tensioning sites would be required for this project. Conductor tensioning sites typically disturb an area of about 1 acre. Disturbance is temporary. Any disturbed area would be restored to pre-construction conditions.

At the dead-end structures, BPA uses two methods to attach the conductor to the structure. The first method, hydraulic compression fittings, uses a large press and pump that closes a metal clamp or sleeve onto the conductor. This method requires heavy equipment and is time consuming. The second method, implosive fittings, uses explosives to compress the metal together. The implosive fittings do a better job of compressing the sleeve onto the conductor and actually weld the metals together. Implosive fittings do not require heavy equipment, but do create noise similar to a loud explosion when the primer is struck. BPA is proposing to use implosive fittings on this project.

Two smaller wires, called ground wires, would also be attached to the top of the transmission structures. Ground wires are used for lightning protection. There is also a series of wires and/or grounding rods (called counterpoise) buried in the ground at each structure. These wires are used to establish a low resistance path to earth, usually for lightning protection.

A fiber optic cable would also be strung on the structures. The fiber optic cable would have up to 36 fibers. The fibers would be used for communications as part of the power system. Fiber optics technology uses light pulses instead of radio or electrical signals to transmit messages. This communication system can gather information about the system (such as the transmission lines in service and the amount of power being carried, meter readings at interchange points, and status of equipment and alarms).

2.1.1.3 Right-of-Way

BPA would acquire easements to build, operate and maintain the transmission line across private properties. The Proposed Action would require new right-of-way 125 feet wide over about 12 miles.

2.1.1.4 Right-of-Way Clearing

Tall trees cannot be allowed to grow into or near the lines because electricity can arc, which can start a fire or injure or kill someone nearby. Most of the land along the right-of-way is in wheat production or has other low-growing vegetation compatible with transmission lines. There are few tall trees along the proposed route and no trees would likely be removed.

2.1.1.5 Access Roads

BPA would use the existing road system as much as possible for construction. However, access would be necessary for construction to each structure site. Any roads needed in farmed fields would be about 14-feet wide, would be temporary and would be removed after construction. If construction were scheduled during the dry season, little or no rock would be necessary on the roads. Access roads would be used by cranes, excavators, supply trucks, boom trucks, and line trucks for construction of the transmission line.

Ground disturbed for temporary roads would be restored to its pre-construction condition after the transmission lines would be built. If crop damage were to occur during construction or maintenance, landowners would be compensated. The exact location of temporary roads, if any would be needed, would not be known until a construction contractor defines their access needs. Access road locations would be coordinated with landowners, to the extent practical, to minimize impacts on property.

2.1.1.6 Stream Crossings

The transmission line would occasionally span across waters of the State or US. The majority of the drainages mapped as intermittent streams on USGS maps did not meet criteria for regulation as jurisdictional waters. The USGS typically bases its mapping of intermittent streams on topography rather than field observation. During the site visit, DEA determined that many of the historically mapped drainages had been plowed through and no longer displayed bed and bank characteristics or other characteristics necessary for indicating the presence of a jurisdictional water body.

Six drainage features containing waters of the state and US (i.e., jurisdictional) were identified during the site visit. They are displayed in Figure 2, and are described separately in the Affected Environment section below.

2.1.1.7 Gates

Some landowners/land managers have policies regarding public access to their properties. Locked gates are commonly used to restrict public access. BPA cooperates with landowners on a case-by-case basis on permanent access, gates and locks.

2.1.1.8 Staging Areas

During transmission line construction, steel, electrical conductors, insulators and hardware are often stockpiled at a site called a staging area or material yard. The contractor(s) hired to construct the line would secure temporary rights to establish a staging area. One 5-acre staging area would be needed for this project. To facilitate construction efficiency, staging areas tend to be located next to highways and main roads. Staging areas are only used prior to and during construction.

2.1.2 Substations

Substations contain electrical equipment that enables BPA to interconnect several different transmission lines, disconnect lines for maintenance or outage conditions, and regulate voltage.

BPA proposes to expand its existing John Day 500-KV Substation by about 0.3 acre inside the existing yard to include a new 500-kV bay with two transformers. The south fence would be extended and a dead end tower on the southwest corner would be built to connect to a new 230-kV substation.

BPA would build a new 230-kV substation adjacent to and south of John Day 500-kV Substation. The new substation would include a transformer, ring bus and other typical substation equipment. The new substation would encompass about 5 acres.

BPA also intends to consider the impacts of building another substation in the area. Because more local wind generation projects are expected to be constructed in the coming years, a substation is likely to be needed in the vicinity to integrate them into BPA's transmission system; however, another substation is not needed at this time.

2.1.3 Communication Facilities

Microwave communication sites and fiber-optic communication lines connect BPA's high-voltage substations to system control centers located in Vancouver and Spokane, Washington. Dispatchers within the control centers remotely monitor meters and gauges on electric power equipment within each substation and receive alarm signals if an emergency were to occur. Dispatchers have the ability to disconnect lines and electrical equipment when transmission failures do occur.

Communications between the wind farm collector facilities and the proposed new 230-kV substation would be accomplished with fiber optic cables. Redundant fiber optics cables with alternate routes would be installed between the new substation and the existing 500-kV substation to ensure that no single failure would disable communications. The circuits would be connected to the existing BPA communication system.

2.1.4 Maintenance

During the life of the project, BPA would perform routine, periodic maintenance and emergency repairs to the transmission line. Maintenance usually involves replacing insulators. Twice a year, a

helicopter would fly over the line to look for hot spots (areas where electricity may not be flowing correctly) or other problems indicating that a repair may be needed.

Vegetation is also maintained along the line for safe operation and to allow access to the line. The project area would need little vegetation maintenance because it is mostly farmed.

If vegetation maintenance is needed, BPA would use an integrated vegetation management strategy for controlling vegetation along its transmission line rights-of-way. The strategy involves choosing the appropriate method for controlling the vegetation based on the type of vegetation and its density, the natural resources present at a particular site, landowner requests, regulations, and costs. BPA may use a number of different methods: manual (hand-pulling, chainsaws), mechanical (roller-choppers, brush-hogs), biological (insects or fungus for attacking noxious weeds), and herbicides.

Prior to controlling vegetation, BPA sends notices to landowners and requests information that might help in determining appropriate methods and mitigation measures (such as herbicide-free buffer zones around springs or wells). Noxious weed control is also part of BPA's vegetation maintenance program and BPA works with the county weed boards and landowners on area-wide plans for noxious weed control.

2.2 MIDDLE ALTERNATIVE

The Middle Alternative would originate from the same location north of PPM's Klondike Schoolhouse Substation as the Proposed Action, but would follow a different route to the new 230-kV substation. This alternative would be approximately 12.5 miles long.

The Middle Alternative has all the components of the Proposed Action, but uses a different alignment.

2.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, no interconnection agreements would be signed with PPM and Orion, and no new substation, substation expansion or transmission line would be constructed.

2.4 KLONDIKE III WIND PROJECT

The Klondike III Wind Project, which would be built by PPM Energy, would consist of an approximately 273 megawatt (MW) wind generation project in northern Sherman County, Oregon. The proposed project is adjacent to PPM Energy's Klondike I (24 MW) and Klondike II (75 MW) wind projects. It would be constructed on privately-owned land and be connected to the BPA Klondike Schoolhouse Substation.

All Klondike III project facilities would be on private agricultural land upon which PPM Energy has negotiated long-term wind energy leases with the landowners. The wind energy leases allow PPM Energy to permit, construct, and operate wind energy facilities for a defined period. In exchange, the landowners receive compensation. The terms of the wind energy leases allow landowners to continue

their farming operations in and around the wind turbine generators and other facilities where the farming activities would not impact operation and maintenance of the wind generation equipment.

Klondike III Wind Project facilities would consist of up to 165 wind turbines and towers, approximately 19 miles of new roads, an operations and maintenance (O&M) facility, and two substations. Wind turbines and roads would be built within 900-foot-wide corridors. Project facilities would occupy approximately 70 acres of land.

2.4.1 Turbines and Towers

Wind turbines consist of two primary components: a tubular tower, and the nacelle, which rests on the tower. The nacelle houses equipment such as the gearbox and supports the turbine blades and hub. The turbines are interconnected with an underground power collection system and linked to the project substation.

The wind turbines would be grouped in linear strings, some of which would include aviation warning lights required by the Federal Aviation Administration (FAA). The number of turbines with lights and the lighting pattern of the turbines would be determined in consultation with the FAA.

One of two turbine types may be used for the project; PPM Energy has not yet made a selection. However, both types would have similar environmental effects and power generation capabilities. The analysis in this technical memorandum is based on a “worst-case” situation; e.g., for the visual assessment, the taller of the two turbines was analysed, and for the noise evaluation, the louder was analyzed.

The blade diameter of the turbines would range from 77 to 82 meters. The height at the hub would be up to 80 meters. The swept area of the rotor would be from 4,658 to 5,281 square meters, and the rotor speed could be between 10 and 18 revolutions per minute (rpm).

The tower supporting each wind turbine would be a tapered monopole, roughly 80 meters tall. It would be supported by a spread footer concrete foundation. The underground footprint of each foundation would be approximately 2,000 square feet. The actual foundation design would be determined based on site-specific geotechnical information and structural loading requirements of the selected turbine model. The towers would be uniformly painted a neutral gray or white color. Each tower would have a locked entry door at ground level and an internal access ladder with safety platforms for access to the nacelle. A controller cabinet would be inside each tower at its base. Towers are typically fabricated in three sections that are assembled on-site, and they are designed to withstand the maximum wind speeds expected at the project – typically 60 meters per second (m/s) (134 miles per hour [mph]) at hub height.

A generator step-up (GSU) transformer would be installed at the base of each wind turbine to increase the output voltage of the wind turbine to the voltage of the power collection system (typically 34.5 kV). Small concrete slab foundations would support the GSU transformers.

2.4.2 Power Collection System

A network of underground power lines would be installed within the prism of new and existing roads at the project to collect power generated by the individual wind turbines and route the power to a collector substation for delivery into the utility grid. The power collection system would operate at 34.5 kV. Where geotechnical conditions or other engineering considerations require, the collector system may be aboveground.

Power from the eastern section of the project would be routed to a collector substation near Webfoot. From that substation, aboveground power lines, hung on single wood or steel poles of a type similar to other power lines in the area, would carry the power approximately 3.5 miles to the BPA Klondike Schoolhouse Substation. The poles would be approximately 110 feet tall, sunk 30 feet deep. They would be spaced approximately 500 to 700 feet apart. All poles would conform to raptor protection guidelines.

2.4.3 Interconnection/Substations

Additional substation equipment near the existing BPA Klondike Schoolhouse Substation would be constructed to accommodate and step up the additional power entering the grid. The additional substation equipment would include foundations, circuit breakers, power transformer(s), bus and insulators, disconnect switches, relaying, battery and charger, surge arrestors, AC and DC supplies, control house, metering equipment, SCADA provision, grounding, fence, and associated control wiring. The facilities would conform to all applicable Oregon and BPA regulations and standards, as required.

The proposed collector substation would occupy approximately four acres of land.

A collector substation would also be built on a four-acre parcel near Webfoot. The O&M facility would be on the same parcel.

2.4.4 Operations and Maintenance Facility

An approximately 5,000-square-foot O&M building would be built on the Klondike III project site, on a four-acre parcel near Webfoot. A water supply (on-site well of <5000 gallons/day) and sanitary facilities would be constructed at the new O&M site to serve the Klondike III project. Power to the new O&M building would be supplied by Wasco Electric Cooperative and would be carried from the existing O&M building one mile east on the poles of the aboveground collection system

2.4.5 SCADA System

A supervisory, control and data acquisition (SCADA) system to be installed at the project would collect operating and performance data from each wind turbine and the project as a whole, and provide remote operation of the wind turbines. The wind turbines would be linked to a central computer via a fiber optic network. The host computer is expected to be located in the operations and maintenance (O&M) facility at the project site.

2.4.6 Meteorological Towers

Three permanent, un-guyed, meteorological towers would also be part of the facility. They would collect wind resource data.

2.4.7 Roads

Within the project, approximately 19 miles of new roads would be constructed to access turbines. The roads would be 20 feet wide and constructed with crushed gravel.

Existing roads in the project vicinity would be upgraded and widened, where necessary, to accommodate construction and O&M equipment.

Temporary access roads may also be built during construction. They would be removed after construction.

2.4.8 Construction Laydown Areas

Approximately 55 acres of temporary disturbance would occur in 19 laydown areas that would be used to stage construction and store supplies and equipment during construction. A 2-acre laydown area would be adjacent to each proposed turbine string, and four 4-acre laydown areas would be located throughout the project site. The laydown areas would have a crushed gravel surface. After construction, the laydown areas would be removed, and the disturbed areas would be restored to their pre-construction conditions.

2.5 BIGLOW CANYON WIND FARM

The Biglow Canyon Wind Farm facility, proposed by Orion Energy, would be an approximately 450 MW wind generation project in northern Sherman County. The Biglow Canyon Wind Farm will be connected to BPA's transmission system at one of two alternative substations on the Biglow Canyon Wind Farm site. Orion Energy is responsible for selecting its substation alternative.

The project would be built on private land. Orion Energy has negotiated long-term wind energy leases with the landowners in which the energy facilities would be constructed and operated in exchange for compensation to the landowners.

The Biglow Canyon Wind Farm would consist of up to 225 wind turbines and towers, approximately 40 miles of new roads, an O&M facility, and a substation. Wind turbines and roads would be built within 500-foot-wide corridors. Project facilities would occupy approximately 177 acres of land.

2.5.1 Turbines and Towers

Generally, the turbines and towers for the Biglow Canyon Wind Farm project would be similar to those described for the Klondike III Wind Project. As with the Klondike III project, the specific turbine type has not yet been selected. The blade diameter of the turbines would likely be up to 100

meters, and the tower height would be up to 85 meters. The analysis in this technical memorandum is based on a "worst-case" scenario, as described for the Klondike III project.

2.5.2 Power Collection System

A transformer would be placed next to each turbine tower to increase the output voltage to 34.5 kV. Each transformer would be placed on a concrete slab. From the transformer, power would be transmitted via electric cables, some of which would be buried. In areas where collector cables from several turbine strings follow the same alignment (e.g., near the facility substation), multiple sets of cables could be installed within a single trench. There would be approximately 700,000 feet of underground electric cables.

In some areas, collector lines may be installed above ground on pole or tower structures. Aboveground lines would allow the collector lines to span terrain such as canyons, native grasslands, wetlands, and intermittent streams, thereby reducing environmental impacts, or to span cultivated areas and reduce impacts to farming. Overhead structures would generally be between 23 and 28 feet tall.

2.5.3 Substation and Interconnection to BPA

The Biglow Canyon Wind Farm will be connected to BPA's transmission system at one of two alternative substations on the Biglow Canyon Wind Farm site. Orion Energy is responsible for selecting its substation alternative. With either option, the proposed substation site would be a graveled, fenced area of up to 6 acres, with transformer and switching equipment and a parking area. Transformers would be non-PCB (polychlorinated biphenyl), oil-filled types.

2.5.4 Operations and Maintenance Facility

A permanent O&M facility would include approximately 5,000 square feet of enclosed space, including office and workshop areas, control room, kitchen, bathroom, shower, utility sink, and other facilities. Water would come from a well that would be constructed on the site. Water use is not expected to exceed 1,000 gallons per day. Domestic wastewater would drain to an on-site septic system. A graveled parking area for employees, visitors, and equipment would be built in the vicinity of the building. The O&M facility may be built adjacent to the proposed substation on the Biglow Canyon project site.

2.5.5 SCADA System

A SCADA system, similar to that described for the Klondike III project, would be installed and linked to a central computer in the O&M building.

2.5.6 Meteorological Towers

Up to 10 meteorological towers would be placed throughout the Biglow Canyon project site. The towers, which would be up to 279 feet tall, would collect wind resource data.

2.5.7 Roads

Existing roads in the project vicinity are typically 16 to 20 feet wide. Some existing roads would be widened—up to 35 feet wide for construction, and up to 16 or 18 feet wide for operation, including an additional 5 to 6 feet of shoulders. Roads would be improved, where necessary, by adding an all-weather surface.

New access roads would be constructed where there are no roads near proposed turbine strings. Approximately 40 miles of new access roads would be built. They would be approximately 16 to 18 feet wide for operation, including an additional 5 to 6 feet of shoulders.

Temporary access roads may also be built during construction. They would be removed after construction.

2.5.8 Construction Laydown Areas

Up to six principal, temporary laydown areas for construction staging would be located on site. Each laydown area would comprise up to five acres and would be covered with gravel. After construction, the gravel would be removed and the area restored.

In addition to the principal laydown areas, temporary laydown areas would be located at each turbine location and at each turbine string. Each turbine laydown area would temporarily disturb approximately 4,000 square feet. Placement of blades in the laydown areas is expected to result in little or no soil disturbance.

In total, construction activities (e.g., laydown areas and collector system trenches) would disturb approximately 375 acres.

3 AFFECTED ENVIRONMENT

3.1 GENERAL LANDSCAPE CHARACTER

The general landscape character within the analysis area typically features rolling hills in dry land winter wheat production or grasses dedicated to conservation easements through the Conservation Reserve Program (CRP) administered by the Natural Resources Conservation Service (NRCS). Most of the project area is in wheat production. Very little acreage of native plant communities remain, occurring in small patches along tributaries and unnamed drainages to the Columbia, John Day, and Deschutes rivers. These communities consist of shrublands dominated by sagebrush (*Artemisia tridentata*) and rabbitbrush (*Chrysothamnus* sp.), and native bunchgrass grasslands (various spp.), which generally have a high percent cover of invasive species such as cheatgrass (*Bromus tectorum*) mixed with sparse cover of native grasses such as bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), and Idaho fescue (*Festuca idahoensis*) where fire and human disturbance has not eliminated them from the landscape. Agricultural areas dominate the plateau to the east. Agricultural areas that are enrolled under the CRP are located mainly in the western portion of the project corridor. CRP areas have been planted with a mix of native and non-native bunch grasses with the primary intent of increasing wildlife habitat in the area.

The Deschutes River Canyon and John Day River Canyon are important features draining to the Columbia River. Basalt cliffs and rock outcrops are typical within the river canyons and are important visual elements. Where vegetation is not in agricultural production or conservation, it is characterized by shrub-steppe habitat typical to central Oregon. Trees are very sparse, usually occurring in ravines or near the few homesites as shelter belts. The Cascade Mountains, including views of Mount Hood and other peaks and ridgelines, are visible in the distant background in clear conditions when not blocked by local topography. Elevations along the plateau, within the project area, range from approximately 1,250 feet to 1,500 feet. Elevations at the western end of the project corridor drop to roughly 800 feet at the bottom of the Gerking Canyon drainage. Photos 1 through 4 (Appendix B) provide typical images of the landscape in the project area including existing wind turbines and substation facilities.

Multiple transmission and distribution lines cross the project area as well as transportation corridors including the Columbia River, Interstate 84 (I-84), US Highway 97, Oregon Route (OR) 206, and Washington State Route 14 (SR-14).

3.2 IMPORTANT VISUAL RESOURCES

Several important visual resources have been identified in the analysis area. These resources, described below, are summarized in Table 1 and identified in Figures 2 and 3.

Table 1. Important Visual Resources within the Analysis Area and Their Approximate Minimum Distance from the Proposed Facilities

Visual Resource	Direction/Distance (miles) from		
	BPA	Klondike III	Biglow
Columbia River Gorge National Scenic Area	W, 9	NW, 12.2	W, 10
John Day River Canyon	E, 2.5	E, 0.8	W, 23
Oregon National Historic Trail High Potential Sites:			
Fourmile Canyon	E, 25	E, 20.0	E, 23
John Day River Crossing (a.k.a. McDonald Ferry)	SE, 4	E, 2.0	SE, 6
Biggs Junction	W, 7	NW, 11.0	W, 8
Deschutes River Crossing	W, 10	NW, 13.5	W, 11
The Dalles Complex	W, 24	W, 28.0	W, 25
Lower Deschutes River Canyon	W, 9	W, 8.0	W, 10
Lower Klickitat River Canyon	W, 25	NW, 27.5	W, 26
Journey Through Time Scenic Byway	SW, 1.5	W, 0.5	W, 2

3.2.1 Columbia River Gorge National Scenic Area

The Columbia River Gorge National Scenic Area (CRGNSA) is managed for an “unparalleled combination of scenery, geology, plants, wildlife, and multicultural history” (Columbia River Gorge

Commission and USFS, 1992). The exceptional beauty of this region is largely derived from its diverse character. Key viewing areas (KVAs) are important viewpoints open to the public offering opportunities to view the Gorge. KVAs within the analysis area include Historic Columbia River Highway, I-84, Washington SR-14, the Columbia River, and Rowena Plateau (i.e., Tom McCall Preserve). Designated Scenic Travel Corridors in the analysis area include the Historic Columbia River Highway, I-84, SR-14, and Washington State Route 142 (SR-142), and I-84. A view from the eastern boundary of the CRGNSA along SR-14 to the project area is shown in Photo 5.

3.2.2 John Day River Canyon

The John Day River system includes more than 500 river miles and is one of the longest free-flowing river systems in the continental United States (USDI Bureau of Land Management [BLM], 2001). The landscape within the analysis area features high desert communities of sagebrush and juniper with intermingled private ranches adding visual interest along the river (BLM, 2000). The John Day River Canyon (i.e., the area from rim to rim) is identified as an "area of high visual quality" (BLM, 1986). The BLM manages its lands in this area as a Visual Resource Management (VRM) Class II resource, meaning management activities resulting in changes to the existing character of the landscape may be allowed, provided they do not attract the attention of the casual observer (USDI 2000). A typical view of the John Day River corridor near McDonald Crossing is shown in Photo 6.

Beginning at Tumwater Falls near river mile 10 upstream through the analysis area, the river is a designated Federal Wild and Scenic River and classified as Recreational, meaning that at the time of designation, the segment was readily accessible by road or railroad, may have some shoreline development, and may have undergone some impoundment or diversion in the past. Outstanding remarkable values in this segment include "scenic, recreation, fish, wildlife, geological, paleontological, and archaeological" values. Botanical and ecological values are also deemed important (BLM, 2001). The segment is designated as a State Scenic Waterway pursuant to the Oregon State Scenic Waterways Act, ORS 390.805-390.925.

The Two Rivers Resource Management Plan Record of Decision (BLM, 1986) identifies two Special Management Areas relevant to this project: the Oregon Trail Historic Sites at Fourmile Canyon and McDonald Crossing, and the John Day River Canyon. For the trail sites, "the unusual qualities of these sites will be maintained and protected" (BLM, 1986). For the canyon, "areas of high visual and natural quality will continue to be protected while allowing other compatible uses in the same area" (BLM, 1986).

3.2.3 Oregon National Historic Trail

In 1978, Congress authorized the Oregon National Historic Trail to commemorate the historic Oregon Trail and to promote its preservation, interpretation, public use, and appreciation. The Management and Use Plan Update Final Environmental Impact Statement Oregon National Historic Trail and Mormon Pioneer National Historic Trail (USDI, National Park Service [NPS], 1999), is a coordinating document that provides broad-based polices, guidelines, and standards for administering the trail to guide its protection, interpretation, and continued use.

Within the analysis area, the plan identifies five High-Potential Sites based on "historic significance, the presence of visible historic remnants, scenic quality, and relative freedom from intrusion" (USDI 1999). These sites include Fourmile Canyon, John Day River Crossing (a.k.a. McDonald Ferry), Biggs Junction, Deschutes River Crossing, and The Dalles Complex. The plan does not identify specific scenic or aesthetic values in the analysis area beyond these five sites. Intact segments or other visual evidence (e.g., wagon ruts, scars) of the trail are not known to exist within the project area. Nearly all evidence of the trail within the analysis area has been destroyed through agricultural practices. Photo 7 depicts typical conditions along the trail alignment in the project vicinity.

3.2.4 Lower Deschutes River Canyon

The Lower Deschutes River is a designated Federal Wild and Scenic River and Oregon State Scenic Waterway. The Lower Deschutes Canyon "contains a diversity of landforms, vegetation and color" (BLM 2001) where the river has carved a dramatic canyon through rugged Columbia River basalt flows. Riparian vegetation provides stark contrast against the broken reddish brown canyon walls. Transportation corridors (roads and railroad), and rural development occur in several areas throughout the canyon.

3.2.5 Lower Klickitat River Canyon

The lower ten miles of the Klickitat River from its confluence with Wheeler Creek, near the town of Pitt, to its confluence with the Columbia River is designated a Federal Wild and Scenic River with a Recreational classification. Outstandingly remarkable resources include the river's free-flowing nature, resident and anadromous fish and their habitats, Native American dip-net fishing, and the geology of the lower gorge (USFS, 1991). A small area in the Wahkiacus drainage of the Klickitat River canyon is designated as a wildflower viewing area (Priebe, 2005).

3.2.6 Journey Through Time Scenic Byway

The Journey Through Time Scenic Byway is administered through the Oregon Department of Transportation Scenic Byway Program. The Journey Through Time Management Plan speaks to the rural heritage and history of the 286-mile route through north central Oregon. The plan establishes four goals: create jobs; maintain rural lifestyles (i.e., support traditional industries of agriculture and timber); protect important values (e.g., historical attractions); and build identity for the north central Oregon region. The plan identifies the communities of Wasco, Moro, and Grass Valley, the Historic Oregon Trail and Barlow Road, and the Sherman County Museum as points of interest within the analysis area. Photos 8 and 9 illustrate typical views from the byway at milepost 12 approximately three miles south of Wasco.

3.2.7 Local Site Features

In addition to the Deschutes and John Day rivers, Sherman County identifies rock outcroppings and trees as important landscape features (Sherman County, 2003). Gilliam County identifies "rock outcroppings marking the rim and walls of steep canyon slopes as an important characteristic of the county's landscape" as well as the John Day River (Gilliam County, 2000).

3.3 BPA'S PROPOSED ACTION

The transmission line alignment for BPA's Proposed Action does not occur within the boundary of any important visual resources (e.g., John Day Wild and Scenic River boundary); however, the transmission line would cross the Oregon National Historic Trail alignment. Segments of the Proposed Action alignment would likely be visible from small portions of the Journey Through Time Scenic Byway, the John Day River corridor, and the CRGNSA, including SR-14. The transmission line and substation facilities would be visible from (and often adjacent to) several roads in the project vicinity. Portions of the alignment would likely be visible from private residences in the project vicinity.

3.4 MIDDLE ALTERNATIVE

The Middle Alternative would be visible or not visible from the same general areas as the Proposed Action.

3.5 KLONDIKE III WIND PROJECT

The Klondike III Wind Project would not occur within the boundary of any important visual resources. The project would likely be visible from portions of the John Day River corridor, the CRGNSA, including SR-14; and the Journey Through Time Scenic Byway. Turbine strings would cross the Oregon National Historic Trail alignment in several locations. Turbines would be visible from local roads and private residences in the project vicinity.

3.6 BIGLOW CANYON WIND FARM

The Biglow Canyon Wind Farm would be visible or not visible from the same general areas as the Klondike III Wind Project.

4 ENVIRONMENTAL CONSEQUENCES

4.1 IMPACT LEVELS

Impacts would be considered **high** where actions would:

- Become the dominant feature or focal point of the view, especially from residences or schools.
- Become the dominant feature or focal point of the view and adversely affect the existing character and quality of views from parks, recreation facilities, public trails, and public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use, such as the Columbia Gorge National Scenic Area.
- Affect a large number of sensitive viewers in predominantly the foreground and middle ground of the view.

- Become the dominant feature or focal point of view from major travel corridors along which existing scenic quality is high and/or policies have been applied to preserve and enhance aesthetic values.

Impacts would be considered **moderate** where actions would:

- Be clearly visible in the view but not the dominant feature of the view.
- Affect a large number of sensitive viewers mostly in the middleground of their view.
- Not become the dominant view but are in view from parks, recreation facilities, public trails, and public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use.
- Not become the dominant view but would be in view from major travel corridors along which existing scenic quality is high and/or policies have been applied to preserve and enhance aesthetic values.
- Not become the dominant view but would be in view from locally important roads along which visual quality is not high and which have not been designated for scenic protection.

Impacts would be considered **low** where actions would:

- Be somewhat visible but not obtrusive in the view.
- Be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view.

No impact would occur if:

- The facilities would be isolated, screened, not noticed in the view, or seen from a distance greater than 3 miles.
- No visually sensitive resources would be affected.

Table 2 summarizes potential impacts to visual resources within the analysis area. Descriptions of impacts to the general project vicinity and important visual resources are provided below.

Table 2. Summary of Impacts to Visual Resources within the Analysis

Visual Resource	Level of Impact		
	BPA	Klondike III	Biglow

Visual Resource	Level of Impact		
	BPA	Klondike III	Biglow
General Project Vicinity	Mod	Mod to High	Mod to High
Columbia River Gorge National Scenic Area	Low to none	Low to none	Low to none
John Day River Canyon	None	Low to Mod	Low to Mod
Oregon National Historic Trail High Potential Sites:			
Fourmile Canyon	None	None	None
John Day River Crossing (a.k.a. McDonald Ferry)	None	Low to Mod	None
Biggs Junction	None	None	None
Deschutes River Crossing	None	None	None
The Dalles Complex	None	None	None
Lower Deschutes River Canyon	None	None	Low to none
Lower Klickitat River Canyon	None	None	None
Journey Through Time Scenic Byway	Low	Low to Mod	Low to Mod

4.2 BPA'S PROPOSED ACTION

4.2.1 Impacts

A visibility analysis (Figures 4 and 5) was conducted for the proposed transmission line alignment to determine areas from which the alignment would likely be visible. The analysis conservatively assumed towers would occur at angle points and at 900-foot intervals along the alignment and would be 120 feet tall. The substation facilities were not modeled because they are of similar nature and adjacent to existing facilities and would not likely increase the visual effect of the existing facilities.

The visibility analysis indicates the Proposed Action would likely be visible from portions of the CRGNSA, including SR-14; the John Day River corridor; and the Journey Through Time Scenic Byway. The Proposed Action alignment would cross the Historic Oregon Trail alignment, but not in the vicinity of any intact trail segments. The transmission alignment would not be visible from known intact trail segments or from the High Potential Sites identified in the trail's management plan (NPS, 1999).

General Project Vicinity

The proposed facility would be visible from many locations in the analysis area at distances ranging from the immediate foreground (less than 100 feet) to the distant background (greater than 20 miles).

The proposed facility would be highly visible in the foreground from local roads, local residences and agricultural lands in rural Sherman County.

Within the general project vicinity (excluding the John Day River Corridor which is discussed below), the Proposed Action would result in moderate impacts because the transmission lines, towers, and substation facilities generally would be clearly visible in the view but not the dominant feature of the view. It is important to note, however, that the local project vicinity includes few sensitive viewers, lacks Key Viewing Areas (KVAs), and lacks important visual resources with the exception of the John Day River Canyon. Further, local land use policy supports the development of wind energy in Sherman County (Sherman County, 2003).

Columbia River Gorge National Scenic Area

The visibility analysis indicates some portion of the proposed facility would potentially be visible from the CRGNSA. A site visit to I-84 and SR-14 within the CRGNSA boundary indicate the proposed facility would not be visible from I-84 and may be intermittently visible from SR-14. Visibility would occur at such great distances (approximately nine miles) that impacts, if any, would be low. Photo 5 illustrates views from the CRGNSA east boundary at SR-14 toward the project area. Almost without exception, topography or vegetation would screen the proposed facility from view.

The visibility analysis also suggests portions of the proposed facility would be visible within the CRGNSA in Oregon nearer the Deschutes River. Access to these areas is very limited, so opportunities to view the proposed facility are low. The proposed facility would be subordinate to the existing landscape character, which includes multiple transmission lines of similar character to the Proposed Action.

In summary, topography and vegetation would substantially screen the proposed facility from the majority of the CRGNSA. It is possible that the proposed facility would be visible in the distant background from some areas with limited to very limited access and opportunities for viewing. In those areas, the proposed facility would be subordinate to the landscape setting that typically includes substantial human development such as interstate and rail transportation corridors, transmission lines, and urban and rural development in the foreground, middleground, and background.

Impacts to the CRGNSA would be low to none because the proposed facility would be somewhat visible, but not obtrusive; would be seen by few sensitive viewers in the background; and would be seen from a distance of greater than three miles.

John Day River Canyon

The BLM administers the majority of public lands within the John Day River Canyon and has indicated that its concern would be visual impacts seen from the John Day River (Mottl H., 2005). The proposed facility may be visible from higher portions of the John Day River Canyon (i.e., near the canyon rim), but it would not be visible from the river.

No impacts would occur to the John Day River Canyon because the Proposed Action would not be seen from the river.

Oregon National Historic Trail

The Proposed Action alignment would cross the trail alignment in areas where previous agricultural activities have destroyed any evidence of the trail. The proposed facility would not be visible at Fourmile Canyon, Biggs Junction, the Deschutes River Crossing, McDonald Ferry, or The Dalles Complex. Therefore, there would be no impact to these resources.

Lower Deschutes River Canyon

The proposed facility would not be visible from the Lower Deschutes River Canyon. Therefore, there would be no impact to this resource.

Lower Klickitat River Canyon

The proposed facility would not be visible from the Lower Klickitat River Canyon. Therefore, there would be no impact to this resource.

Journey Through Time Scenic Byway

Portions of the proposed facility would likely be visible from the Byway. However, the proposed facility would be compatible with the Journey Through Time Management Plan's stated goals. The communities of Wasco and Moro have no stated scenic or visual management goals or objectives and the Sherman County Comp Plan Goal XVIII supports the development of wind energy (Sherman County, 2003).

The proposed facility would have low impacts on the Journey Through Time Scenic Byway because it would be somewhat visible but not obtrusive in the view and would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view.

4.2.2 Mitigation

Impacts to the general project vicinity would be moderate and would be compatible with applicable management plans and land use policies Impacts to important visual resources would be low to none. Since the Proposed Action would be compatible with applicable management plans and land use policies, no mitigation would be necessary to compensate for project impacts. However, the following best management practices would be implemented to further reduce potential impacts:

- Use of steel tubes (vs. steel lattice) for towers to the extent possible
- Use of non-reflective gray paint on tower structures

- Use of non-specular conductors (i.e., a conductor that has been modified to reduce the amount of reflected light from its surface)

4.3 MIDDLE ALTERNATIVE

4.3.1 Impacts

Impacts would be similar for the Middle Alternative as for the Proposed Action and would result in moderate impacts to the general project vicinity and low to no impacts to important visual resources. The visibility analysis (Figures 4 and 5) shows the areas from which the Middle Alternative and Proposed Action may be visible. See Section 4.2.1.

4.3.2 Mitigation

Mitigation measures would not be required since impacts would be compatible with applicable management plans and land use policies. The same best management practices would be incorporated in the Middle Alternative as in the Proposed Action to further reduce potential impacts.

4.4 KLONDIKE III WIND POWER PROJECT

4.4.1 Impacts

A visibility analysis using GIS software and USGS 30-meter and 10-meter DEMs was conducted for the proposed Klondike III Wind Project to determine areas from which the project may be visible. The visibility analysis indicates the project would be highly visible in the general project vicinity and would likely be visible from portions of the CRGNSA including SR-14, John Day River Canyon, and the Journey Through Time Scenic Byway, and from the vicinity of McDonald Crossing, an Oregon National Historic Trail High Potential Site. The discussion on potential impacts to important visual resources has been taken from the Klondike III Wind Project ASC (DEA, 2005).

General Project Vicinity

The proposed Klondike III Wind Power Project would be visible from many locations in the analysis area at distances ranging from the immediate foreground (less than 100 feet) to the distant background (greater than 20 miles). The proposed facility would be highly visible in the foreground from local roads and agricultural lands in rural Sherman County. Turbines would be visible in the middleground and background from portions of US 97 and SR-14 in Washington near Maryhill and other similar locations.

Within the general project vicinity (excluding the John Day River Corridor which is discussed below), the facility would result in moderate to high impacts because the turbines and appurtenances would become the dominant feature or focal point of the view and would be clearly visible in the view but not the dominant feature of the view. It is important to note, however, that the general project vicinity includes few sensitive viewers, lacks Key Viewing Areas (KVAs), and lacks important visual resources with the exception of the John Day River Canyon. Further, local land use policy supports the development of wind energy in Sherman County (Sherman County, 2003).

Columbia River Gorge National Scenic Area

The visibility analyses for Oregon and Washington indicate some portion of the proposed facility would potentially be visible from the CRGNSA. The principal investigator visited several locations to ground-truth the models. Site visits to the Wasco County Museum, I-84, US Highway 30, and Cherry Heights Road (west of The Dalles) indicate the proposed facility would not be visible as indicated by the visibility analysis results, or would be visible at such great distances (approximately 20 miles or greater) that impacts, if any, would be negligible. Almost without exception, topography or vegetation would screen the proposed facility from view. The model also suggests portions of the proposed facility would be visible within the CRGNSA in Oregon near the Deschutes River. Access to those areas is very limited, so opportunities to view the proposed facility are not substantial.

In Washington, the proposed facility would not be visible from SR-142 in the analysis area, and may be intermittently visible from SR-14 near the east end of CRGNSA. Further, access to the other areas within the CRGNSA from which the proposed facility would be visible is very limited, if existent at all. Opportunities to view the proposed facility are not substantial.

In summary, topography and vegetation would substantially screen the proposed facility from the majority of the CRGNSA. It is possible that the proposed facility would be visible in the distant background from some areas with limited to very limited access and opportunities for viewing. In those areas, the proposed facility would be subordinate to the landscape setting that typically includes substantial human development such as interstate and rail transportation corridors, transmission line corridors, and urban and rural development in the foreground and middleground.

Impacts to the CRGNSA would be low to none because the proposed facility would be somewhat visible, but not obtrusive; would be seen by few sensitive viewers in the background; and would be seen from a distance of greater than three miles.

John Day River Canyon

The BLM administers the majority of public lands within the John Day Canyon and has indicated that its concern would be visual impacts seen from the John Day River (Mottl H., 2005). Therefore, the following assessment keys on impacts to the river and its shoreline and does not consider impacts to the canyon walls that have very limited access. Portions of the proposed facility would be visible from locations along the upper portions of the canyon walls with the highest likelihood occurring downstream of McDonald Ferry (approximately river mile 20.7).

The computer modeling and analyses indicate portions of the proposed facility would be visible from two river segments: one near McDonald Ferry, the other between approximate river miles 15.9 and 16.8.

From the vicinity of McDonald Ferry, visibility analyses and simulations indicate the blade tips of three turbines would be visible. The nacelle and blades of another turbine would be visible. The turbines would not be visible from the nearby BLM interpretive facility for the Historic Oregon Trail

or its access road. From a boater's perspective, viewing the turbines would require looking back up the canyon. Assuming a floating speed of four miles per hour (mph), the turbines would be in view for approximately one and one-half minutes. The turbines would appear small in scale in the background compared to other human development impacts in the canyon (e.g., irrigated pasture, farm and irrigation equipment, farm houses, trailers, fences, livestock, power lines) that are visible in the foreground and middleground from the river. Other factors contributing to the minimal contrast of the proposed facility include viewing distance, angle of observation, light conditions, and atmospheric conditions, which have the effect of making the turbines less visible when the sun is in the west or when views are obscured by precipitation, haze, dust, smoke, or fog.

The proposed facility as seen from McDonald Ferry would have a weak contrast and would therefore be compatible with BLM's VRM Class II management objective: "management activities resulting in changes to the existing character of the landscape may be allowed, provided they do not attract the attention of the casual observer" (BLM, 2000).

The second area of impact would occur between approximate river miles 15.9 and 16.8. Visibility analyses and simulations indicate that the blade tips of six turbines would be visible at different times for different durations through the approximately one-mile segment. Most turbines would be visible for much less of the one-mile segment. Assuming a floating speed of four mph, the viewer would move through this one-mile segment in approximately 14 minutes.

In many cases, the turbines' silhouettes would be barely discernible, if at all. Similar to the turbines' effects at McDonald Ferry, the turbines in this segment would appear small in scale compared to other development in the canyon and to the scale of the canyon in general. The distance from the viewer to the turbines, angle of observation, light conditions, and atmospheric conditions would further reduce perceived contrast and impacts. The potential impacts in this segment would be weak and would therefore be compatible with BLM's VRM Class II management objective.

Impacts resulting from the proposed facility would be low to moderate because the proposed facility would not become the dominant view but would be in view from parks, recreation facilities, public trails, public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use, would be somewhat visible but not obtrusive in the view, and would be seen by few sensitive viewers because facility would be substantially screened by existing topography.

Oregon National Historic Trail

The proposed facility would not be visible at Fourmile Canyon, Biggs Junction, the Deschutes River Crossing, and The Dalles Complex (Anderson, 2005; Fitzwater, 2005). Therefore, there would be no impacts to these resources.

Portions of four turbines would be visible from the John Day River and small portions of its banks at McDonald Ferry. The proposed facility would not be visible from the BLM interpretive site near McDonald Ferry or from the road accessing the interpretive site. Factors including the limited length

of viewing time, relative small size and scale of the impact, and spatial relationships substantially limit the contrast of the proposed facility against the existing landscape. Other factors including the angle of observation, light conditions, and atmospheric conditions will also limit the significance of the impact.

The proposed facility would have moderate to low impacts on McDonald Ferry because portions of the project would not become the dominant view but would be in view from public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use, would be somewhat visible but not obtrusive in the view, and would be seen by few sensitive viewers because facilities are screened by existing topography.

Lower Deschutes River Canyon

The proposed facility would not be visible from the Lower Deschutes River Canyon (Anderson, 2005; Fitzwater, 2005;, Houck, 2005; Mottl, T., 2005). Therefore, there would be no impact to this resource.

Lower Klickitat River Canyon

The proposed facility would not be visible from the Lower Klickitat River Canyon. Therefore, there would be no impact to this resource.

Journey Through Time Scenic Byway

Portions of the proposed facility would be visible from the Byway. A representation of potential impacts viewed from the intersection of US 97 and Old Sherman Highway approximately one mile south of Wasco in included in Appendix C. Although portions of some turbines would be visible, the proposed facility would be compatible with the Journey Through Time Scenic Byway stated goals. Portions of the proposed facility may be visible from Wasco and its immediate surroundings, but existing buildings and topography would likely screen most of the turbines from view. The visibility analysis indicates that the proposed facility would be visible from some areas near Moro. Field investigations suggest topography and vegetation would substantially block views from Moro and the Sherman County Museum. The proposed facility would not be visible from Grass Valley. The communities of Wasco and Moro have no stated scenic or visual management goals or objectives and the Sherman County Comp Plan Goal XVIII supports the development of wind energy (Sherman County 2003).

The proposed facility would have low to moderate impacts on the Journey Through Time Scenic Byway because portions of the project:

- would be visible in the view but not the dominant feature of the view;
- would not become the dominant view but would be in view from locally important roads along which visual quality is not high and which have not been designated for scenic protection;

- would be somewhat visible but not obtrusive in the view; and
- would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view

4.4.2 Mitigation

Impacts to the general project vicinity would be moderate to high and would be compatible with applicable management plans and land use policies. Since the proposed facility would be compatible with applicable management plans and land use policies, no mitigation would be necessary to compensate for project impacts.

Impacts to the Journey Through Time Scenic Byway would be low to moderate. Since the proposed facility would be compatible with applicable management plans and local land use policies, mitigation would not be required.

Impacts to the John Day River canyon including McDonald Ferry would be low to moderate. Since the proposed facility would be compatible with applicable management plans and local land use policies, mitigation would not be required.

Impacts to other important visual resources and to the landscape in general would be low to none, so mitigation would not be required. However, the following best management practices would be implemented to further reduce potential impacts:

- Implementation of active dust suppression measures during the construction period to minimize the creation of dust clouds.
- Use of wind turbine towers, nacelles, and rotors that are locally uniform and that conform to high standards of industrial design to present a trim, uncluttered, aesthetic appearance.
- Use of low-reflectivity, neutral gray, white, off-white, or earth tone finishes for the towers, nacelles, and rotors to minimize contrast with the sky backdrop and to minimize the reflections that can call attention to structures in the landscape.
- Use of neutral gray, white, off-white, or earth tone finishes for the small cabinets containing pad-mounted equipment that might be located at the base of each turbine, to help the cabinets blend into the surrounding ground plane.
- Restriction of exterior lighting on the turbines to the aviation warning lights required by the FAA, which will be kept to the minimum required number and intensity to meet FAA standards.
- Placement of much of the electrical collection system underground, minimizing the system's visual impacts.

- Use of a low-reflectivity finish for the exterior of the O&M facility building to maximize its visual integration into the surrounding landscape.
- Restriction of outdoor night lighting at the O&M facility and the substation to the minimum required for safety and security; sensors and switches will be used to keep lighting turned off when not required, and all lights will be hooded and directed to minimize backscatter and offsite light trespass.
- Use of a low-reflectivity finish for substation equipment.
- Use of low-reflectivity insulators in the substations.
- Use of fencing with a dull finish around the substation to reduce the fence's contrast with the surroundings.

4.5 BIGLOW CANYON WIND FARM

4.5.1 Impacts

The visual impact analysis included in the Biglow Canyon Wind Farm Association considered all facility components. However, because of the large distances from most of the designated scenic resources, the limited lines of sight from the closest designated scenic resources, and the dominance of wind turbines compared to other components of the facility in terms of visual impact, the visual appearance of the facility from all scenic areas consists almost entirely of the wind turbines. For this reason, the following discussion focuses on the turbines.

General Project Vicinity

The Biglow Canyon Wind Farm would have similar general impacts to the visual environment as the Klondike III Wind Project; that is, the proposed facility would be visible from many locations in the analysis area at distances ranging from the immediate foreground to the distant background. The proposed facility would be highly visible in the foreground from local roads and agricultural lands in rural Sherman County where viewer sensitivity is presumably low, KVAs are absent, and the nearby landscape generally lacks important visual resources with the exception of the John Day River canyon. Turbines would be visible in the middleground and background from portions of US 97 and SR-14 in Washington near Maryhill and other similar locations.

Within the general project vicinity (excluding the John Day River Corridor which is discussed below), the facility would result in moderate to high impacts because the turbines and appurtenances would become the dominant feature or focal point of the view and would be clearly visible in the view but not the dominant feature of the view. Similarly to the potential impacts that would result from the Klondike III Wind Project, it is important to note that the general project vicinity includes few sensitive viewers, lacks Key Viewing Areas (KVAs), and lacks important visual resources with the exception of the John Day River Canyon.

Columbia River Gorge National Scenic Area

Because the facility lies more than ten miles outside of the closest boundaries of the CRGNSA, it is not directly regulated by the CRGNSA's plan policies and regulations. Nonetheless, this section describes potential visual impacts of the project as seen from KVAs. The facility has the potential to be visible from portions of four KVAs: the Historic Columbia River Highway, I-84, the Columbia River, and SR-14.

Historic Columbia River Highway

A relatively short segment of the Historic Columbia River Highway lies within the facility's 30-mile radius analysis area. With the possibility of one small exception, the facility would not be visible from the Historic Columbia River Highway. The exception occurs along a small segment of the roadway located at the western edge of The Dalles where the visibility analysis suggests that the turbines might be visible along about one mile of the roadway. However, the likelihood of the facility having a noticeable effect on views from this road segment is very small. In this area, most views from the roadway toward the facility site would probably be screened by intervening trees, vegetation, and structures. Moreover, at a distance of 28 miles, the turbines would be invisible in many atmospheric and weather conditions and barely detectable under the most favorable atmospheric conditions. Finally, in this area, the roadway is not oriented in the direction of the facility site, so that to the extent that the turbines would be detectable in the view, they would not appear in the primary zone of vision of highway travelers.

Impacts to the Historic Columbia River Highway would be low to none because the proposed facility would be somewhat visible but not obtrusive in the view; would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than three miles.

Interstate 84

For the most part, the facility will not be visible to travelers on I-84. The only places where the facility's turbines might be seen by travelers on I-84 within the CRGNSA are in a set of short segments, adding up to approximately three and one-half miles, located in the area between The Dalles and the Deschutes River at distances ranging from 13.5 to 18 miles from the facility site. From this section of the roadway, the facility site is visible on the distant ridgeline above the point where the river fades into the distance. Because of the viewing distances involved, the turbines would appear to be small and not readily detectable elements on the distant horizon and would occupy only a small area of the overall field of view.

Impacts to I-84 within the NSA would be low to none because the proposed facility would be somewhat visible but not obtrusive in the view; would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than three miles.

Columbia River

The facility's visibility from the Columbia River will be restricted to segments of the river reach between Horsethief Lake and Miller Island. In this reach, the river has been turned into an artificial lake, named Lake Celilo, by The Dalles Dam. The view seen from this area is of a landscape in which there is a substantial level of human modification that is reflected by the artificial impoundment of the river's waters, the I-84 freeway, large transmission lines, and wheat fields on the distant ridgelines. Users of the river in this area include boaters, commercial barges, fishermen, and windsurfers. The facility site is approximately 14 miles away. Under clear atmospheric conditions, many of the turbines would be visible, but they would appear as very small elements in the distant landscape. On a relative scale, they would be harder to discern than the existing transmission towers visible in the middleground/background. The wind turbines would be a subordinate element of the landscape and would not bring about a substantial change in the overall character and quality of the landscape seen from this area.

Impacts to the Columbia River within the CRGNSA would be low to none because the proposed facility would be somewhat visible but not obtrusive in the view; would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than three miles.

Washington State Route 14

The proposed facility would likely be intermittently visible along the segment of SR-14 that lies between Highway 197 north of The Dalles and the eastern boundary of the CRGNSA near Maryhill. This highway segment lies 10 to 24 miles to the west of the facility site. Because the highway in this area is located halfway up the slope of the hills that define the northern edge of the gorge, it provides panoramic views over the Gorge and the landscapes to the south.

The most important developed viewpoint along this segment of SR-14 is the one above Wishram that includes an information kiosk and interpretive panels related to Celilo Falls, an important Native American resource and cultural site that once existed in the river below this viewpoint. Celilo Falls was eliminated when Lake Celilo was created by the construction of The Dalles Dam. Visibility analyses indicate that a relatively small number of the facility's turbines would potentially be visible from this viewpoint. Given the viewpoint's 13-mile distance from the facility site, the turbines would be small elements on the distant skyline and would be less evident in the view than the existing transmission towers visible in the foreground/middleground. Although the turbines would be visible to some degree in this view, they will not dominate the view and would not create a substantial change in the view's overall character and quality.

A second developed viewpoint exists in this segment of the highway in the area just inside the CRGNSA's eastern boundary at Maryhill. The proposed turbines would be visible at a minimum distance of 10.5 miles from this viewpoint. The facility turbines would be visible but not highly evident elements in the landscape, and would not dominate the view. The turbines would be

relatively small elements occupying a small part of the view and would be visually consistent with the turbines that are now an established part of the view.

Impacts to SR-14 within the CRGNSA would be low to none because the proposed facility would be somewhat visible but not obtrusive in the view; would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than three miles.

Deschutes River Canyon

Visibility analyses indicate that the facility would not be visible from the areas in the Deschutes River canyon along the Deschutes Wild and Scenic River and would be visible only from a small area of the BLM lands within and adjacent to the canyon. Because none of the BLM or private lands that lie within the canyon would be directly affected by the facility and because the facility would not be visible from the interior of the canyon, the facility would be consistent with the BLM Two Rivers Plan and with the provisions of the Wasco County and Sherman County comprehensive plans that identify the Deschutes River canyon as an important landscape feature.

Impacts to the Deschutes River Canyon would be low to none because the proposed facility would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view; and would not be noticed in the view, or seen from a distance greater than 3 miles.

John Day River

Visibility analyses indicate the facility would be visible to varying degrees from sections of the BLM lands in the canyon and from the Wild and Scenic River/Oregon Scenic Waterway segment of the river and the lands extending from one-quarter to one mile on either side of the river. Most of the lands in this area are privately-owned ranch lands that are used for cattle grazing; transmission lines of various voltages can be seen on the hills along the edge of the canyon or crossing the canyon. The primary access to these lands is by primitive 4x4 trails located substantially on privately-owned lands. Access is regulated by a series of locked gates so the general public has no overland access to this area. The only public right-of-way through this area is the river channel. During high flow periods in the spring, there is some very limited use of this reach of the river by canoeists and kayakers. During the summer months, low flows and a rocky river channel make passage by watercraft infeasible. Although the John Day River has a reputation as a good river for boating and other recreational activities, these activities occur primarily in the reaches of the river that lie to the south of Cottonwood in an area where the facility would not be visible. Limited access and recreational use minimize opportunities to view the proposed facility.

In the limited areas along the river corridor from which facility's turbines would potentially be visible, few turbines would be visible from any one point, and only the blades would likely be visible from many locations. In the places where turbines would be visible, they would appear as elements on the ridgelines in the landscape's background and would have minimal direct effect on the

appearance of the walls of the canyon or the canyon floor. Although the turbines would potentially be noticeable in some of the views, because of their small numbers, their location in the background, and the viewing distance (which would range from one to three and one-half miles), they would not likely be dominant elements in the scene. To the extent to which they would be visible, the turbines would be subordinate elements of the view, and because views from the canyon already include views of transmission lines of various voltages and are thus not entirely pristine, the presence of the turbines would not substantially alter the existing character and quality of views from the river corridor.

The proposed facility would have moderate to low impacts because the proposed facility would not become the dominant view but would be in view from public lands and waters used for dispersed recreation where the appreciation of natural and scenic resources is a valued part of the use; would be somewhat visible but not obtrusive in the view; and would be seen by few sensitive viewers because facilities would be screened by existing topography.

Oregon National Historic Trail

The proposed facility would not be visible from the High Potential Sites (McDonald Ferry, Fourmile Canyon, Biggs Junction, the Deschutes River Crossing, and the Dalles Complex) within the analysis area. Therefore, there would be no impacts to those resources.

Lower Klickitat River Canyon

The proposed facility would not be visible from the Lower Klickitat River Canyon. Therefore, there would be no impact to this resource.

Journey Through Time Scenic Byway

Portions of the proposed facility would be visible from the byway; however, the proposed facility would be compatible with the Journey Through Time Scenic Byway's stated goals. The proposed facility would have moderate to low impacts on the Journey Through Time Scenic Byway because portions of the project would be visible in the view but not the dominant feature of the view; would not become the dominant view but would be in view from locally important roads along which visual quality is not high and which have not been designated for scenic protection; would be somewhat visible but not obtrusive in the view; and would be seen by few sensitive viewers because facilities are screened, or predominantly viewed in the middleground and background of the view.

4.5.2 Mitigation

Impacts resulting from development of the Biglow Canyon Wind Farm would be similar to the Klondike III Wind Project. Since impacts, if any, would be compatible with applicable management plans and land use policy, mitigation is not required. Best management practices similar to those proposed for Klondike III Wind Project would be implemented to further reduce potential impacts.

4.6 CUMULATIVE IMPACTS

Klondike I, II, and III Wind Projects, Biglow Canyon Wind Farm, BPA's Action Alternatives, future wind projects, and existing BPA and other transmission and distribution lines would result in cumulative impacts to the visual environment. These intrusions would result in moderate to high impacts to the general project vicinity, but it is important to note that the area includes no KVAs or important visual resources (except for the John Day River Canyon) and that viewer sensitivity is low. Cumulative impacts would likely be low to moderate to important visual resources such as the John Day River Canyon and the Journey Through Time Scenic Byway where facilities would potentially be visible in the foreground and middleground. Cumulative impacts would likely not occur or would be low to the remaining important visual resources in the analysis area because the projects would not be visible, or would be visible at such great distances that effects, if any, would be negligible.

4.7 UNAVOIDABLE EFFECTS, IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Unavoidable effects would include the intrusion of approximately 470 turbines, substation and transmission facilities, and appurtenances on the visual landscape. In general, these impacts would be moderate to high. There would be no irreversible or irretrievable commitments of resources because the proposed project elements could be decommissioned and deconstructed; project development does require the commitment of visual resources.

4.8 NO ACTION ALTERNATIVE

No new impacts to visual resources would occur under the No Action Alternative.

5 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMIT REQUIREMENTS

No known permits or authorizations specific to visual resources have been identified. BLM was consulted about the wind projects. The transmission line wouldn't be visible from the John Day River, so consultation with BLM regarding the BPA Action Alternatives is not recommended.

6 LIST OF PREPARERS

Sean Sullivan, L.A., DEA Senior Landscape Architect conducted the site visit and is the author of this technical report. Mr. Sullivan has a B.L.A. from Mississippi State University, an M.L.A. from the University of Washington, and 13 years professional experience. He has been with DEA since 1996. Kristina Gifford McKenzie, DEA Environmental Planner, reviewed this memorandum for consistency with NEPA requirements. Ms. McKenzie has a Bachelor's degree in Communications and a Master's degree in Urban and Regional Planning. She has 15 years of experience as an environmental planner and has been with DEA since 1990.

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Appendix B. Klondike III/Biglow Canyon Wind Integration Project

PHOTO 1: John Day Substation looking north.

PHOTO 2: Klondike II Wind Project viewed from N. Klondike Road.

PHOTO 3: Rural Sherman County viewed from Gordon Ridge near Moro looking northeast.

PHOTO 4: Gerking Canyon viewed from Scott Canyon Road looking north.

PHOTO 5: View from east end of CRGNSA at SR-14 looking southeast toward project vicinity.

PHOTO 6: John Day River Canyon viewed from Oregon Trail interpretive site at McDonald Ferry looking northeast.

PHOTO 7: Approximate Oregon National Historic Trail alignment crossing viewed from Medler Lane looking east.

PHOTO 8: US 97 at MP 12 looking south.

PHOTO 9: US 97 at MP 12 looking north.